Centralizing individual variation: “Relative Fluency” as a measurement in heritage speaker speech rate analysis

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Introduction

This study proposes a new ‘relative fluency’ (RF) score to measure speech rate across a heritage speaker’s languages.

- The heterogeneity of heritage speakers as a group is well known, and it poses many problems in studying this bilingual population.
- Several different methods have been employed in attempts to measure the language ability of heritage speakers, including questionnaires, self-rated proficiency scores, lexical proficiency tests, and speech analysis.
- Very few studies have examined heritage language speech rate.

Previous approaches make three main assumptions:

- Faster = more fluent
- Monolingual baseline comparisons are sufficient
- Individual speech rate variation does not need to be accounted for

Relative Fluency Score

- Calculated as Spanish WPM / English WPM
- Based on Spanish, each participant’s first learned language
- 0 = balanced, negative score = faster in English, positive score = faster in Spanish

Research Questions

1. Can a raw WPM or RF score reflect aspects of dominance differences among highly proficient Spanish-English Heritage Speaker (HS) and Late Bilingual (LB) speakers in speech rate analysis?
2. What factors (bilingual group, individual speech rate, filler use, region of origin, self-rated fluency) influence speech rate among highly proficient Spanish-English bilinguals in their dominant and non-dominant languages?

Design & Methods

Participants

Heritage Speakers (HS) (n=37)
- Born in Anglophone U.S. or arrived before age 8 (M=2.57, SD=1.81)
- Raised speaking primarily Spanish to age 10 by LB caregiver(s)
- Learned a societal minority language at home, acquired societal majority language later. Dominant in L2 (societal majority language)

Late Bilinguals (LB) (n=23)
- Born and raised in Spanish-speaking region
- Arrived in Anglophone U.S. after age 14 (M=23.35, SD=6.39)
- Live and work in a society where the majority language is not their L1. Acquired societal majority language past adolescence. Dominant in L1 (societal minority language)

Data Collection

- Language elicitation task: Frog, Where are You? (Berman & Slöbin, 1994) in both English and Spanish
- Raw WPM (with and without fillers) was collected for both languages

Analysis & Results

Words Per Minute (WPM)

<table>
<thead>
<tr>
<th>Score</th>
<th>HS</th>
<th>LB</th>
<th>Across</th>
</tr>
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<tbody>
<tr>
<td>Spanish WPM</td>
<td>120.47</td>
<td>127.42</td>
<td>125.13</td>
</tr>
<tr>
<td>English WPM</td>
<td>133.00</td>
<td>123.23</td>
<td>125.07</td>
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<td>T-tests</td>
<td></td>
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<tr>
<td>English WPM: t(58) = -3.15, p&lt;.001</td>
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<tr>
<td>Spanish WPM: t(45.79) = 1.12, p = .27</td>
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<td>Group means are significantly different for English but not for Spanish</td>
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Relative Fluency

- Reflects differences in aspects of dominance
- Controls for individual speech rate differences
- Filler use, region of origin

Possible Factors Influencing Fluency

Individual Variation

- Spanish WPM and English WPM: highly correlated by and across
- A participant with a faster speech rate in English will have a faster speech rate in Spanish

Self-rated Fluency

- Both groups at ceiling
- More variation needed

Filler Use

- No group differences in filler use
- Filler not influencing speech rate

Region of Origin

- ANOVA: F(1, 40)=0.70, p = .45
- No group differences
- Region not influencing fluency

Discussion

WPM vs RF

- The raw WPM scores only support group differences in English, and do not illustrate dominance differences between groups.
- All results with the RF score support previous findings of group dominance differences: LBs are dominant in Spanish while HSs are dominant in English.

Possible Influencing Factors

- Of the other factors studied, only bilingual group was shown to influence the RF score. Fillers and region of origin showed no effects, and self-rated fluency scores proved to be an inappropriate measure for these populations due to ceiling effects.
- Individual speech rate effects were found (see correlations), which suggest that speech rate must be controlled, as is done with the RF.

Research Question Factor Supported?
1. Can a raw WPM or RF score reflect aspects of dominance differences among highly proficient Spanish-English HS and LB speakers in speech rate analysis? Raw WPM RF Score ✔

Benefits of the RF Score

1. Controls for individual speech rate differences
2. Obviates the need for monolingual comparisons by comparing two bilingual groups to each other
3. Reflects differences in aspects of dominance

Next Steps

- Compare the RF score with participants’ sociolinguistic variables

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